BETTER FRUIT

VOLUME XI JANUARY, 1917 NUMBER 7

Following January, BETTER FRUIT *will publish monthly articles in advance of the spraying season, on spraying for all the important pests and diseases.*

SPECIAL SPRAYING EDITION

Future editions of BETTER FRUIT *will feature the conference on all of the important problems that were discussed at the National Apple Show.*

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The President of one of the largest advertising agencies in America, in a letter to BETTER FRUIT *voluntarily says: "You have been a first-class, high-tone, clean, gentlemanly publisher, putting out one of the best publications I know of."*

The Editor, Mr. E. H. Shepard, takes pleasure in saying BETTER FRUIT *will cover a wider field in reading contents. Future editions will contain valuable information, on every important phase of the fruit industry: growing, harvesting, packing, selling, marketing, distribution, advertising, consumption.*

Information on these vital subjects is absolutely necessary to solve the problems that confront the industry. Progressive commercial fruit growers must know more about them, do some thinking and prepare themselves to act. Read BETTER FRUIT.

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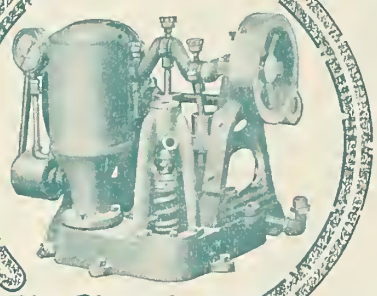

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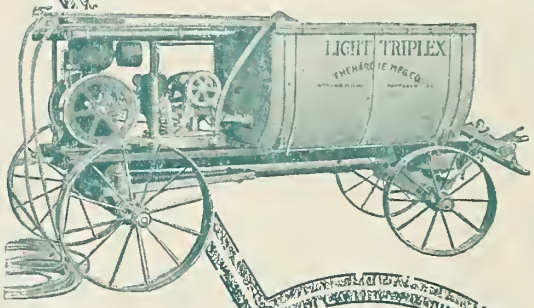

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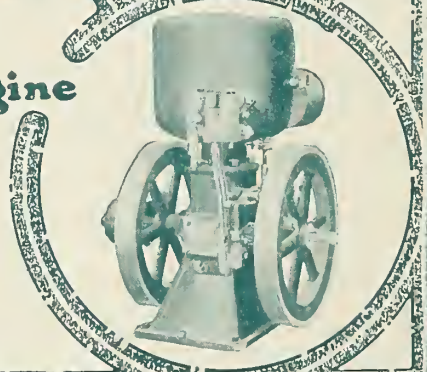

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BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

Fungus Sprays—Based on 50 Different Observations

Report Made by Sam G. Campbell, Chief Inspector of the Apple Growers' Association, Hood River, Oregon

[Editor's Note.—The following observations afford some very interesting information in reference to spraying for fungus. Particularly valuable for the reason that the exhibits are the work of fruit growers in a practical way in commercial orchards. It should be noted that the spraying program is for the whole orchard, not for a few rows or a few trees, spraying in a particular manner in the same very thorough way, which is beyond the capacity of the average grower with a large orchard. It may be noted in addition that the fruit growers of Hood River Valley have profited from their experiences of 1915, and through the assistance of the experiment station have produced a crop of apples this year that is practically free from scab, many growers having less than one per cent and very few to exceed five per cent. It is the intention in the next issue of "Better Fruit" to give a program of the spraying methods that have been followed this year, which have been extremely successful in controlling scab.]

IN presenting the following information for your consideration and benefit, I desire to say that the investigations cover 50 orchards in Hood River valley. In each case the number of sprays, time applied and the fungicides used are stated in the various exhibits, also the strength which is used in each one of the fungicides.

The dormant spray means the fall application of bordeaux. The spray referred to as delayed dormant means the spray which is usually applied as the buds begin swelling, which in some instances is extended by the growers after the buds have opened out and the leaves advanced quite conspicuously. The percentages of scab given are at thinning time.

The estimates are furnished by the growers and in my judgment are about correct, as nearly as could be determined by estimate without actual counts.

The main object of this information is, first, to show that where the greatest number of sprays were used, the cleanest crops were obtained; second, to show that certain omissions in spraying were more serious than others; third, that certain fungicides gave better results than others.

First, I will give you the number of sprays and data in reference to each individual orchard. These are classified in exhibits—all growers who followed a spraying program which was alike are classified under "Exhibit A." The numbers after Exhibit A and B indicate the number of growers who followed the same system. These exhibits run from "A" to "S." In some exhibits there are half a dozen or more, and in some there is only one example of the spraying method. Where there are more than one the average percentage of scab at thinning time for the entire number is given.

I will now proceed to give you the program, followed by the different exhibits, and later furnish observations and conclusions:

Exhibit A-1: Fall bordeaux, delayed lime-sulphur 1-9. Delayed dormant, semi-dormant, pink, calyx and ten days. Six sprays, 5 per cent fungus.

Exhibit B-1: Fall bordeaux, lime-sulphur 1-10. Delayed dormant, lime-sulphur 1-40, pink, calyx and ten days. Five sprays, 5 per cent fungus.

Exhibit B-2: Fall bordeaux, delayed dormant lime-sulphur 1-12, pink lime-sulphur 1-25, calyx lime-sulphur 1-30, ten days lime-sulphur 1-40. Five sprays, 10 per cent fungus.

Please note this orchard had 20 per cent fungus in 1914.

Exhibit B-3: Fall bordeaux, delayed dormant lime-sulphur 1-10, pink bordeaux 4-4-50, calyx lime-sulphur 1-35, ten days lime-sulphur 1-40. Five sprays, 15 per cent fungus.

Average fungus Exhibit B 10 per cent. The average fungus in Exhibit B was increased by B-2 using an insufficient quantity, applying only two gallons of spray for trees about 13 years old; otherwise Exhibit B would probably have shown an average of about from 5 to 7½ per cent fungus.

Exhibit C-1: Delayed dormant lime-sulphur 1-10, pink, calyx and ten days lime-sulphur 1-40. Four sprays, 5 per cent fungus.

Exhibit D-1: Fall bordeaux, delayed dormant lime-sulphur 1-20, pink and calyx lime-sulphur 1-35, ten days atomic sulphur 6 pounds-100 gallons. Five sprays, 10 per cent fungus.

Exhibit D-2: Fall bordeaux, delayed dormant lime-sulphur 1-10, pink lime-sulphur 1-30, calyx lime-sulphur 1-33, ten days atomic sulphur 6 pounds-100 gallons. Five sprays, 25 per cent fungus.

Exhibit D, average fungus 17½ per cent.

Exhibit E-1: Fall bordeaux, delayed dormant lime-sulphur 1-20, pink lime-sulphur 1-35, calyx atomic sulphur 12 pounds-100 gallons, ten days atomic sulphur 10 pounds-100 gallons. Five sprays, 15 per cent fungus.

Exhibit F-1: Fall bordeaux, pink lime-sulphur 1-20, calyx lime-sulphur 1-36, ten days atomic sulphur 6 pounds-100 gallons. Four sprays, 5 per cent fungus.

Exhibit F-2: Fall bordeaux, pink lime-sulphur 1-20, calyx lime-sulphur 1-35 part of orchard, bordeaux 4-4-50 other part; ten days bordeaux 2½-4-100. Fungus 15 per cent.

Average fungus Exhibit F 10 per cent; four sprays.

Exhibit G-1: Fall bordeaux, pink lime-sulphur 1-15, calyx lime-sulphur 1-38. Three sprays, 20 per cent fungus.

Exhibit G-2: Fall bordeaux, pink lime-sulphur 1-25, calyx lime-sulphur 1-38. Three sprays, 20 per cent fungus.

Average fungus Exhibit G, three sprays, 20 per cent.

Exhibit H-1: Fall bordeaux, delayed dormant lime-sulphur 1-20, calyx lime-sulphur 1-35, ten days 1-40. Four sprays, 10 per cent fungus.

Exhibit H-2: Fall bordeaux, delayed dormant lime-sulphur 1-10, calyx lime-sulphur 1-35, ten days bordeaux 4-5-50. Four sprays, 30 per cent fungus.

Exhibit H-3: Fall bordeaux, delayed dormant lime-sulphur 1-10, calyx lime-sulphur 1-35, ten days bordeaux 4-5-50. Four sprays, 30 per cent fungus.

Exhibit H-4: Fall bordeaux, delayed dormant bordeaux 6-6-50, calyx lime-sulphur 1-40, ten days lime-sulphur 1-30. Four sprays, 35 per cent fungus.

Average fungus Exhibit H 26¼ per cent. Four sprays, pink spray being omitted.

Exhibit I-1: Fall bordeaux, delayed dormant lime-sulphur 1-11, pink lime-sulphur 1-28, calyx lime-sulphur 1-28. Four sprays, 20 per cent fungus.

Exhibit I-2: Fall bordeaux, delayed dormant lime-sulphur 1-12, pink lime-sulphur 1-25, calyx lime-sulphur 1-35. Four sprays, 25 per cent fungus.

Average fungus Exhibit I 22½ per cent. Four sprays.

Exhibit J-1: Pink lime-sulphur 1-20, calyx lime-sulphur 1-25. Two sprays, 30 per cent fungus.

Exhibit J-2: Pink lime-sulphur 1-10, calyx lime-sulphur 1-30, ten days atomic sulphur 7 pounds-100 gallons. Three sprays, 35 per cent fungus.

Aevrage fungus Exhibit J, two and three sprays, 32 per cent.

Exhibit K-1: Delayed dormant lime-sulphur 1-10, calyx lime-sulphur 1-15, ten days lime-sulphur 1-15. Three sprays, 15 per cent fungus.

[Note—Rather exceptional; good result probably due to delayed dormant being put on late enough to be near early pink and extra strength of lime-sulphur was used in calyx and ten days. This strength, however, is dangerous, and may cause russeting of fruit and burning of foliage.]

Exhibit L-1: Fall bordeaux, delayed dormant lime-sulphur 1-10, calyx lime-sulphur 1-40. Three sprays, 25 per cent fungus.

Exhibit L-2: Delayed dormant lime-sulphur 1-9, calyx lime-sulphur 1-35. Two sprays, 50 per cent fungus.

Average fungus Exhibit L, two and three sprays, 37½ per cent.

Exhibit M-1: Fall bordeaux, pink lime-sulphur 1-20. Two sprays, 50 per cent fungus.

Exhibit M-2: Fall bordeaux, pink lime-sulphur 1-10 part of orchard, other part bordeaux 4-6-50. Two sprays, 50 per cent fungus.

Average Exhibit M 50 per cent.

Exhibit N-1: Delayed dormant lime-sulphur 1-10, pink lime-sulphur 1-35, ten days bordeaux (two-thirds of orchard 5-5-50). Three sprays, 25 per cent fungus.

Exhibit N-2: Delayed dormant lime-sulphur 1-9, pink lime-sulphur 1-25. Two sprays, 30 per cent fungus.

Exhibit N-3: Fall bordeaux, delayed dormant lime-sulphur 1-15, pink lime-sulphur 1-30, ten days atomic sulphur 10 pounds-100 gallons. Four sprays, 90 per cent fungus.

Average fungus Exhibit N, two, three and four sprays, 48⅓ per cent.

Exhibi O-1: Calyx lime-sulphur 1-25. One spray, 75 per cent fungus.

Exhibit P-1: Delayed dormant, lime-sulphur 1-10. One spray, 90 per cent fungus.

It seems from a close study and analysis of Exhibits A to P that it may be helpful to the growers of Hood River valley to point out comparisons of these analyses showing the value of a certain number of sprays, and also to point out the loss from the omission of any one of the important sprays. Later on I will speak of the comparative value of different fungicides, as evidenced in these observations, and results.

Exhibit A gave the highest percentage, consisting of six sprays, fall bordeaux, delayed dormant lime-sulphur 1-9, semi-dormant, pink, calyx and ten days lime-sulphur 1-33, showing only 5 per cent fungus at thinning time, the cleanest crop, with one exception, so far as these results show, namely, Exhibit F-1, which I will analyze specifically later.

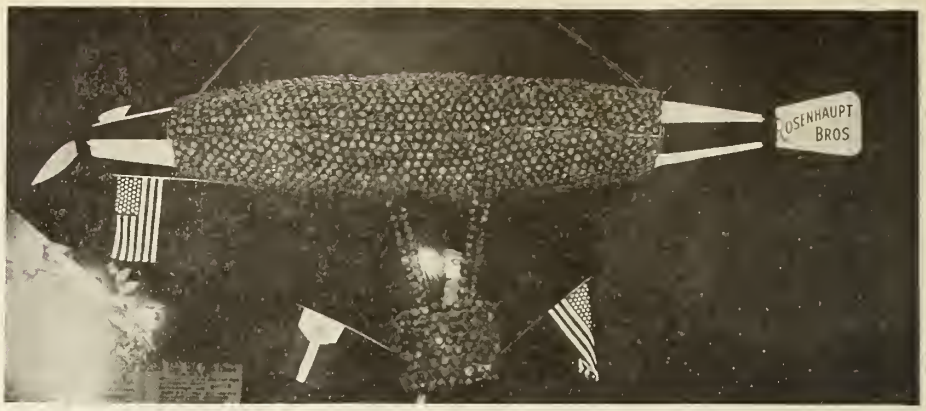
Exhibit B, consisting of five sprays, fall bordeaux, delayed dormant, pink calyx and ten days, 10 per cent fungus; the semi-dormant being omitted.

Exhibit C, four sprays, delayed dormant, pink, calyx and ten days, 5 per cent of fungus; fall bordeaux and semi-dormant omitted.

Exhibit D, five sprays, fall bordeaux, delayed dormant, pink, calyx and ten days, the semi-dormant omitted, fungus 17½ per cent. Attention is called to the increased fungus in Exhibit D, where five sprays were applied, as compared to Exhibit C, where four sprays were applied, that atomic sulphur was used in the calyx in Exhibit D.

Exhibit E, five sprays, fall bordeaux, delayed dormant, pink, calyx and ten days, 15 per cent fungus. Comparisons should be made with Exhibit C, four sprays, showing 5 per cent fungus; attention being called to the fact that in Exhibit E atomic sulphur was used in the pink and calyx.

Exhibit F, four sprays, fall bordeaux, pink, calyx and ten days, delayed dormant and semi-dormant being omitted, fungus 7½ per cent. Comparison should be made with Exhibit C, where five sprays were used, attention to the difference is called for the reason that in Exhibit F the grower applied an extremely early pink, using a large quantity of spray per tree, fungus showing only 5 per cent, thus decreasing the average per cent of fungus in Exhibit F seven below the normal average.



Winner of third prize among original and attractive displays. Baby Zeppelin made of apples, entered by Rosenhaupt Brothers of Mica, Washington. Ninth National Apple Show, Spokane, Washington, November 20-25, 1916.

Exhibit G, three sprays, fall bordeaux, pink and calyx, 20 per cent fungus. Delayed, semi-dormant and ten days omitted.

Exhibit H, four sprays, fall bordeaux, delayed dormant, calyx and ten days, semi-dormant and pink omitted, fungus 26¼ per cent, showing heavy loss from omission of the pink application.

Exhibit I, three and four sprays, fall bordeaux, delayed dormant, pink and calyx (semi-dormant and ten days omitted), fungus 22½ per cent, showing loss by omission of ten days spray.

Exhibit J, two sprays, pink and calyx (fall bordeaux, delayed dormant, semi-dormant and ten days omitted), fungus 32½ per cent.

Exhibit K, three sprays, delayed dormant, calyx and ten days (omitted fall bordeaux, semi-dormant and pink), fungus 15 per cent. Attention is called particularly to the omission of pink spray.

Exhibit L, three sprays, fall bordeaux, delayed dormant and calyx (omitted semi-dormant, pink and ten days), fungus 37½ per cent.

Exhibit M, two sprays, fall bordeaux and pink (omitted delayed dormant, semi-dormant, calyx and ten days), fungus 50 per cent. Attention is called particularly to the omission of the calyx and ten days' sprays.

Exhibit N, two and three sprays, delayed dormant, pink and ten days (omitted fall bordeaux, semi-dormant and calyx). Attention is called particularly to the omission of calyx spray. Fungus 48⅓ per cent.

Exhibit O, one spray, calyx (all others omitted), fungus 75 per cent.

Exhibit P, one spray, delayed dormant (all others omitted), fungus 90 per cent.

From the preceding observations and statements in connection with the estimates of fungus in relation to the number of sprays applied and materials used, and the omission of certain sprays, it is evident to me, and I think will be clear to my fellow apple growers, that any omission of any of the important sprays means more scab. The following indicates the increasing quantity of fungus in the various exhibits in accordance with the different spraying programs as already explained specifically in each individual case.

Exhibit A, 5 per cent.

Exhibit B, 10 per cent. Insufficient quantity of spray increases percentage in this exhibit.

Exhibit C, 5 per cent.

Exhibit D, 17½ per cent.

Exhibit E, 15 per cent.

Exhibit F, 7½ per cent.

[Note—Small percentage of Exhibit F due to using extremely early pink, as already stated in Exhibit F-1.]

Exhibit G, 20 per cent.

Exhibit H, 26¼ per cent.

Exhibit I, 22½ per cent.

Exhibit J, 32½ per cent.

Exhibit K, 15 per cent. [Note—Exceptional.]

Exhibit L, 37½ per cent.

Exhibit M, 50 per cent.

Exhibit N, 48⅓ per cent.

Exhibit O, 75 per cent.

Exhibit P, 90 per cent.

Conclusion: With the data already presented it seems that every grower should be able to plan a spraying schedule which, if applied at the right time and in the right way, will give a crop with an extremely small percentage of fungus. The evidence and results already given are especially convincing.

The cleanest crops were produced in 1915, where the greatest number of sprays were applied.

The omission of the pink or calyx sprays, or both of them, cause the most severe loss.

The use of lime-sulphur in the pink and calyx generally give better results and less fungus.

Bordeaux, in 1914 and 1915, applied in the pink or calyx have caused more or less damage by russeting, in some cases very severe.

It does not appear to be established, nor is it stated by pathologists, that bordeaux in the fall is an important factor in fungus control.

Bordeaux in the fall is a necessary protection in this valley for anthracnose.

As many growers think it has a fungicidal value when applied in the fall, it seems advisable to recommend its application, particularly on account of anthracnose.

Ninth National Apple Show, Spokane, Nov. 24-25, 1916

By Robert S. Phillips, Spokane, Washington

IN many ways the Ninth National Apple Show, held in Spokane, November 20 to 25, was the most successful in the history of that important Northwestern event. The attendance of actual growers was the greatest in the history of the show. They came from all parts of the Northwest, eager to exchange ideas regarding their problems, and ready to give the other fellow the benefit of their experiences and successes in attacking the problems with which they were most familiar.

It was interesting to note the change that has taken place in the big Spokane show during the nine years of its existence. At the outset and for several years the central idea of those behind the show was to assemble a great quantity of apples. The growers sent them in by the carload, and in the racks they covered acres of ground. It made an impressive sight, and served the purpose at that time, but in later years it was found that the expense of assembling this enormous quantity of apples was not justified. They found that the same results could be accomplished with fewer apples on exhibition, and this gave them the opportunity to devote the money and the efforts of their organization toward doing a number of things that have proved to be of very great benefit to the fruitgrowers of the Northwest. This developed the conference idea, which has grown year by year until in 1916 we had the biggest and most successful conference in the history of the show. The big assembly room on the sixth floor of the Chamber of Commerce Building was turned over to the growers. Here they got together five days, each morning and afternoon, and threshed out their problems. One of the big features of the conference was the presence and active participation of James Madison, general manager of the California Associated Raisin Company. Mr. Madison told how the raisin men had doubled their selling price and at the same time doubled their output in the last three years, and he advised application of the raisin men's plan to the apple industry. "Co-operation alone won't do the work," he said in a discussion of the situation. "You will have to have full control of the situation and a central authority. The growers must finance their own business. Of course, the merchants and bankers chipped in some, too. I was a gentleman farmer living in San Francisco. I met another raisin grower at the club one day and he said, 'What can we do to better our condition?' We discussed the matter for a while and I finally told him if he would give me a little money I would give three months of my time. Twenty-five men put up one hundred dollars apiece for stenographers, solicitors, etc. Here is the way I put it up to the growers: This is your company, not my company, but your company. We started in that we were to have $750,000 subscribed in money and sufficient control of the acreage to control the product. Those two things are necessary for a successful co-operative movement. First have control of the product and then have the money to finance it. The farmers must put up the money to run their own business. I found when I started in 36,000 tons of raisins kicking around among the farmers and several thousand tons in the east. This was in April with another crop coming on in four months. I realized that we would be stuck with the fall market coming on unless we could do something to get rid of these raisins. We purchased 25,000 to 26,000 tons of the raisins in California and I bought all the raisins in New York I could get hold of. We sold them and made 16% besides paying all expenses. The raisins sold like hot cakes. Why? Because we were in control of the market. Remember, we started with 36,000 tons and we produced that year 54,000 tons, so that our company handled that year about 90,000 tons of raisins. The following year we handled 93,000 tons and in 1915 130,000 tons. Before our organization was formed, four years prior that the average crop was 78,000 tons, and out of that we had accumulated a margin of 36,000 tons, showing that there was something wrong. On the first day of October, after a crop of 130,000, this year we didn't have a raisin. Now how did we increase this consumption? Advertising and salesmanship. We looked up where the consumption was slight; then the biggest volume of consumption that I could see was with the bakeries. It is all right for the housewife to use raisins, but they don't compare with the bakeries. We induced the bakers to make raisin bread. We have spent about one million dollars in salesmanship and local advertising. We have had seventy men on the road for a year. But the whole cost has been included in that half million dollars. However, in place of carrying over thirty thousand odd tons of raisins today we haven't got a raisin to sell from now until the first of next October. This year some of our raisins were damaged during the season, so that we realized that we would have some raisins not up to standard. We authorized our agents to take orders for these and in four days they sold 31,000 tons, worth over $5,000,000 without a price because we did not want to name a price until we knew how badly the crop was damaged. When you can increase the consumption of a product like raisins, which is more or less limited in its use, I am satisfied that you can do the same with apples. As I was crossing in the ferry at San Francisco the other day I saw a man eating an apple. There are a hundred thousand people crossing in those ferries every day; if you could induce every man coming across to eat an apple think what it would mean."

"Of course it could," he said. "Then one man sitting in his office would control all the apples of the Northwest. You would be putting the prices on them then—not the other guy. Now you throw your apples on the market and the other fellow looks them over and tells you what he'll give, and you have to take it."

During the conferences the joint state commission on fruit marketing appointed by the governors of Washington, Oregon, Idaho and Montana held a public hearing with representative growers, shippers and others interested in the fruit-marketing problem in the

First prize winner in 100-box contest for shippers. Wageners entered by Arcadia Valley Fruit Growers' Association, advertising the "A" Brand. · Ninth National Apple Show, Spokane, 1916.

Northwest. The commission tentatively arrived at the following conclusions:

"It is recognized that the fruit industry of the four Northwest states is in sore need of financial assistance from federal and state agencies to assist in a thorough organization of the fruitgrowers, and that the several states should work in hearty co-operation with the federal office of markets in perfecting the organization of growers. We suggest that the federal government be asked to give additional funds and that the several states be asked to appropriate money to bring about the necessary co-operation with the federal government.

"We further recognize that a substantial step toward the solution of the marketing problem in the box-apple industry of the Pacific Northwest will be made through the passage by the several legislatures of laws providing for official state standardization of grades and packages, with a state system of packing-house inspection and official certification for the protection of the grower, wholesaler, buyer and consumer."

On the final day of the conference the joint commission was instructed by the growers, in a short resolution, to work for uniform laws in the four states concerning apple diseases, grade and pack, and by another resolution to work for a system of state aid in marketing enterprises under state control.

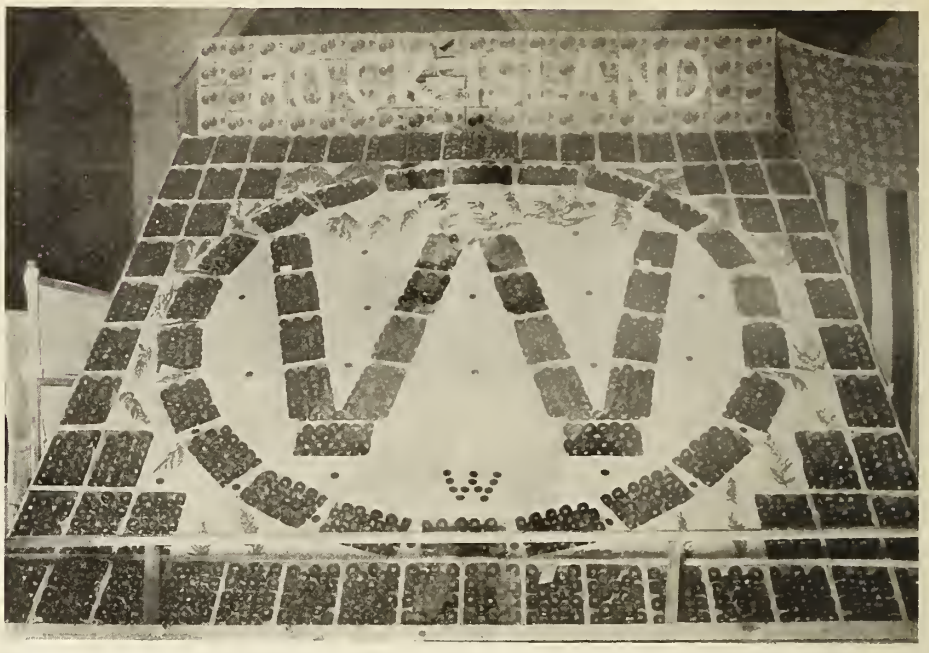
Extensive changes in Washington's apple-grading rules were made by the state grade and pack conference after an all-day battle between the rigid-rule advocates and the liberals. On most points the liberals won. The grade rules as finally adopted by the conference follow:

First Grade.—Grade No. 1, or "extra fancy" apples, are defined as sound, smooth, mature, clean, hand-picked, well-formed apples only, free from all insect pests, diseases, blemishes, bruises and other physical injuries, scald, scab, scale, dry or bitter rot, worms, worm stings, worm holes, spray burn, limb rub, visible water core, skin puncture or skin broken at stem; but slight russeting within the basin of the stem shall be allowed.

Second Grade.—Grade No. 2, or "fancy" apples, are defined as apples complying with the requirements for first-grade apples except that slight sun scald or other blemishes not more than skin deep shall be permitted up to a total of 10 per cent of the surface of the apple.

Third grade, or "C" grade apples, shall consist of apples free from infection but permitting two worm stings, and is shipped in closed packages shall be marked "Third Grade," or "C Grade."

The following minimum color requirements were specified for "extra fancy" and "fancy" apples, the figures indicating the percentage of "color" required in proportion to the total surface area of the apple:



Winner of second prize of $50 in the 100-box contest. Entered by the Rock Island unit of North Central Washington Growers' League. This exhibit was made to advertise the Circle W brand. Ninth National Apple Show, Spokane, November 20-25, 1916.

SOLID RED VARIETIES.

	Extra Fancy Per cent	*Fancy* Per cent
Aiken Red	75	25
Arkansas Black	75	25
Baldwin	75	25
Black Ben Davis	75	25
Black Twig	50	15
Gano	75	25
King David	75	25
McIntosh Red	50	15
Spitzenburg (Esopus)	75	25
Vanderpool	75	25
Winesap	75	25

STRIPED OR PARTIAL RED VARIETIES.

	Extra Fancy Per cent	*Fancy* Per cent
Missouri Pippin	50	10
Jonathan	66⅔	15
Stayman	66⅔	15
Delicious	66⅔	15
Ben Davis	50	10
Hubbardston	50	10
Jeniton	50	10
Northern Spy	50	10
Rainier	50	10
Snow	50	10
Wealthy	50	10
York Imperial	50	10
Wagener	50	10
Gravenstein	25	10
Jeffrey	25	10
King of Tompkins County	25	20
Kaign Spitzenburg	50	10
Rome Beauty	50	No color

Under the heading "Red Cheeked or Blushed Varieties" were listed the Hyde's King, Maiden Blush, Red Cheek Pippin and Winter Banana, the requirements for "extra fancy" being "perceptible blushed check" and for "fancy" "tinge of color," except in the case of the Winter Banana fancy, for which no color requirement was made.

Under the heading "Yellow or Green Varieties" the following apples were grouped:

Grimes Golden, Yellow Newtown, Cox's Orange Pippin, Ortley, Rhode Island Greening, Northwestern Greening, Yellow Belleflower, White Winter Pearmain.

The only color requirement for these apples, in both "extra fancy" and "fancy" grades, is "characteristic color."

Another high light of the conference was a series of arguments, consuming an entire afternoon, in favor of immediate elimination of unprofitable varieties of apples. The most exhaustive treatment of the subject was given by Franck E. Sickles, secretary of the North Pacific Fruit Distributors, who gave growers in detail the result of the study and experience of his organization.

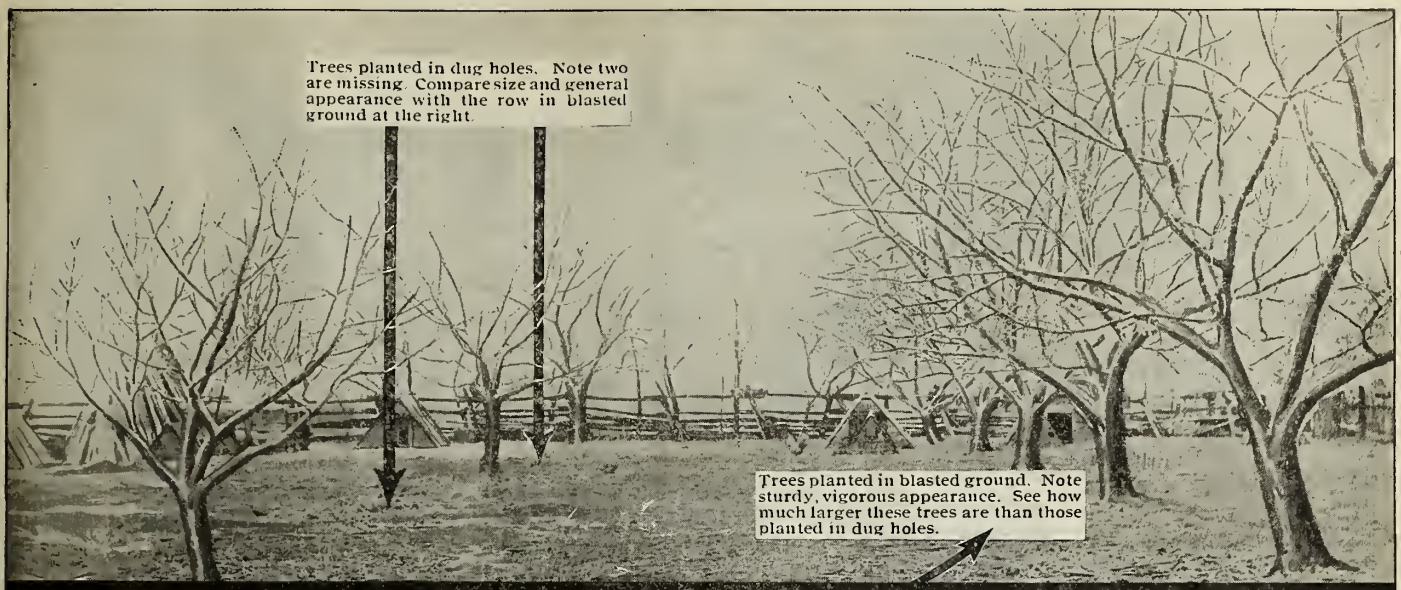
"Apples raised in the Northwest naturally fall into three classes," said Mr. Sickles. "First, those commercial varieties about which none of us probably will disagree. They are profitable varieties or else we have no such thing. I include in this class Arkansas Black, Delicious, Grimes Golden, Jonathans, Ortley, Rome Beauty, Spitzenberg, Winesap, Winter Banana, White Winter Pearmain, Yellow Newtown.

"The second class includes those varieties which are doubtful. I include in this class Aiken Red, Baldwin, Delaware Red, Gano or Black Ben, King David, Mammoth Black Twig, Missouri Pippin, Red Cheek Pippin, Stayman, Vanderpool, Wagener and York Imperial.

"Third class constitutes an innumerable number of varieties, of which small quantities are raised, including Apple of Commerce, Ben Hur, Bismark, Canada Red, Chicago, Champion, Fall Wine, Hoover, Hydes King, Ingram, Kaign Spitz, Kentish, Kinnaird, Mann, N. W. Greening, Pewaukee, Rambo, Salamo, Shackleford, Walbridge and Willow Twig. The sooner the trees which bear this fruit are eliminated the better it will be for the industry and the growers of the Northwest."

The only section in which the last-named varieties ever can be marketed at a profit is the Northwest, Mr. Sickles said, adding that when sales have been made in this section they have filled at an unprofitable price a place which might have been filled at a profitable price with better varieties,

Continued on page 32



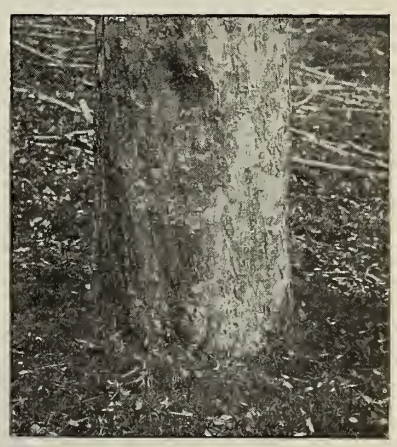
Trees set in blasted holes grow faster and yield better

EIGHTEEN years ago George W. Brown blasted the beds for ninety out of 100 apple trees that he planted. The trees set in dug-holes average 18 feet high, with a spread of 16 feet and a trunk girth of 27 inches. The other trees, in blasted beds, average 25 feet high, more than 25 feet in spread, and have a trunk girth of 42 inches. Plant *your* fruit trees in beds blasted with

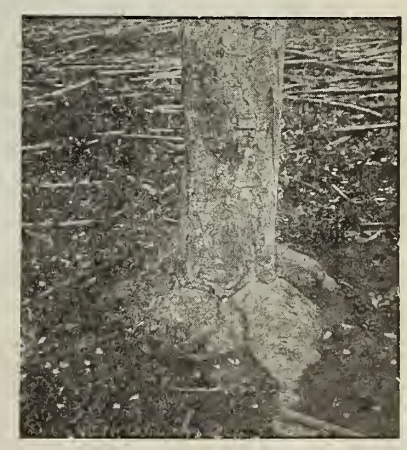
GIANT FARM POWDERS
STUMPING — AGRICULTURAL

and *you* will find, as experiment stations have found, that "trees planted in blasted holes develop deeper and stronger root systems than trees planted in spade-dug holes," and will bear earlier and yield larger crops.

The Giant Farm Powders are made especially to suit *western* farm conditions. They pulverize the soil instead of packing it. They are used by hundreds of fruit growers for planting and deep-tilling their orchards. Ask your dealer for one of the Giant Farm Powders —Giant Stumping Powder or Eureka Stumping Powder, and for other Giant blasting supplies. Be sure to get the genuine, bearing the Giant brand. If your dealer has only ordinary dynamites, we shall see that you are supplied.



Trunk of tree planted in blasted bed Hardpan broken up, giving roots ample room for development.



Trunk of tree planted in same soil, without blasting. Note how hardpan has forced roots to surface and observe effect of lack of food.

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Every fruit grower will find valuable information in our illustrated book, "Better Orchard Tillage." It contains a complete analysis of how and why blasting soils increases growth and yields. It also tells how to do the blasting. We'll send you a copy free—mark and mail the coupon. Other books, on stump blasting, boulder blasting, subsoiling and ditching, also free on request.

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Dust Spraying

Address Delivered by F. A. Frazier Before State Horticultural Society, Hood River, Oregon, December 11-13, 1916

THE subject of Dust Spraying has been under consideration and trial for several years by one of the leading experiment stations in the country, namely, the Experiment Station of Cornell University. This experimental work was brought to a successful conclusion with the closing of the season of 1915. The season of 1916 marked the first general use of this method in New York State and in other fruit sections of the East. The results, on the whole, have been decidedly in favor of the dusting method.

In the use of lime and sulphur solution, it early became apparent to the owner of an orchard of any consequence that he was losing out in his efforts to control scab. This was not because lime and sulphur in itself had failed, but because of conditions which often prevented its application at critical times. And it is because of these conditions that Cornell undertook to work out some means whereby the New York orchards could be protected by something which permitted a quicker application. The dusting method is the result of that investigation and of succeeding years of trial and demonstration. The importance of this you may appreciate, for it was only last year that you of Hood River could not get into your own orchards and apply the liquid spray which was necessary, and the result was an almost total loss of your crop. This had occurred before and it may occur again. It also occurs in the control of codling moth when a spray must be applied within a limited time in order to insure protection.

Several districts in the Northwest had an example of this failure a year ago. At that time many blamed the sprays used, but we all know the blame was not on the arsenate of lead, but in the failure to apply it within the critical time. It was found that the apparent failure of the dusting method, as practiced several years ago, was attributable to coarse and improperly prepared materials, and to inefficient blowers. When finer sulphur was used a greater degree of success resulted; and when a sulphur powder was produced, the larger part of which would pass through a 200-mesh screen, the results approximated the best results obtainable by the use of lime-sulphur solution. With the success in the use of the finely-powdered sulphur against apple scab came the use of combinations with powdered arsenate of lead for the control of the codling moth, and the record is that the poison applied in this way has given better results at a far less cost than have ever been accomplished with liquid sprays. The combination of sulphur with arsenate of lead in the proportion of 85% sulphur and 15% arsenate of lead powder has met with favor. Then, in addition to this, came the use of a finely-powdered tobacco dust, containing a considerable per cent of nicotine, which supplies the requirements which have been met by nicotine sulphate, which is used in the control of aphis and other insects. Thus we have an all-around combination for summer spray in the dust form.

Now, I am not presenting this dust proposition as a cure-all, nor as one that obviates the necessity of intelligent use or thorough application. These are just as essential in the use of dust as with liquid spray, but there are two big advantages standing out prominently in the use of dust,—one, the time element, or the quickness of application; for one can do with the dust in one day as much as can be done in from five to seven days with the liquid spray; and within this time element is

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Codling Moth Investigations for 1915

By E. Leroy Childs, Experiment Station, Hood River, Oregon

[Editor's Note.—The Editor desires to call attention to the fact that these experiments and recommendations apply to the codling moth control as it exists in Hood River Valley, where the codling moth is an easier pest to control on account of the cool climate than it is in some of the fruit sections of the Northwest where the climate is exceedingly hot during the summer months. While the codling moth has been controlled by the Editor with three sprays, the Editor does not wish to have anyone understand that it is his opinion that three sprays for codling moth will give results, either in Hood River or in other fruit sections. Where the first brood of codling moth is extremely bad, many districts have found it advisable to follow the calyx spray with another in ten days or two weeks. When the second brood is particularly bad some growers in some districts have found it necessary to use, in addition to this, two sprays for second brood, and where there is a third or partial third brood another spray later in the season just a short time before harvesting. In fact, it seems to be the opinion of growers in the various districts, according to climatic conditions, the seriousness of the pest, etc., that all the way from three to five sprays will be necessary. More will be said about spraying for codling moth in future editions of "Better Fruit," in advance of the period for spraying for codling moth.]

THROUGHOUT the entire Northwest the codling moth infestation was very severe during 1915, and the loss to fruitgrowers in many sections was very heavy. The Hood River Valley, as a whole, was much more fortunate in this respect than some of the other well-known apple-growing sections. In some orchards, however, where careless methods of application and timing of the arsenate sprays were practiced the losses incurred, due to the worms, reached a total of as high as 50 per cent of the crop.

The loss from this source in the valley during 1915 was about twice that of 1914, and unless more thorough spraying is done during the coming season there is every reason to suppose that the losses will be even greater. In many orchards hibernating larvæ are very plentiful, and with favorable weather conditions these will produce a prolific first brood of worms next spring with their attending serious fruit injury, unless poison is liberally used.

Owing to the fact that there was little time available to devote to a thorough study of the codling moth during 1915, a complete report relative to this insect is not possible at this time. Our investigations carried on during the past season have brought to light, however, several interesting points which should prove of value to the fruitgrowers.

In outlining the experiments it seemed advisable to determine at least the three following points: 1. Does arsenate of lead lose its efficiency when used in combination with one or more fungicides employed in controlling our two most widespread diseases, scab and mildew. 2. Will the "three-spray" schedule control the codling moth in orchards seriously infested. 3. Is the calyx spray (debated by many Hood River growers) essential in effecting satisfactory control.

Inquiries often come to the station relative to the advisability of mixing arsenate of lead with the fungicides that are used in controlling apple diseases. In our investigations during the past season we have used arsenate of lead in combination with lime-sulphur and iron sulphide; lime-sulphur and atomic sulphur; lime-sulphur and barium tetra-sulphide and with milled sulphur and bordeaux mixture. In no case was the efficiency of the poison decreased.

Injury from spray burning to the fruit and foliage was observed in some of the experiments, especially where the first application had been delayed until the foliage growth was well advanced. In one of the experiments the first application, lime-sulphur 1-35, iron sulphide 2-100 and arsenate of lead 5-100 was not applied until the second of June. The foliage on the trees in this experiment, especially on the southeast side was badly burned. The fruit drop was very heavy on all of the sprayed trees. Unfortunately but one check was left—this tree held its fruit. The results, though not conclusive, indicate that later spraying with this combination is at least dangerous after the first of June. In an adjoining experiment where this same combination had been used in the calyx application ten days later, and then the characteristic lime-sulphur burn.

During the past season several experiments were carried on to determine if it were possible to eliminate some of the earlier codling moth sprays in badly infested orchards and still obtain effective control of the first generation of worms. The following combinations were tried out: First, calyx application only; second, calyx, "10-day" later and the "30-day" application; third, calyx and "30-day" application; fourth, "30-day" only. The crosses in the accompanying table indicate the combination used.

EXPERIMENTS TO DETERMINE SPRAYS NECESSARY FOR CODLING MOTH CONTROL.

	First: Calyx. May 5	*Second: "10-day" June 2*	*Third: "30-day." June 2*	*Fourth: Summer application. Aug. 10*	*Fruit counted*	*Per cent wormy*	*Calyx entrance*	*Side entrance*
Experiment 1	×	..	..	×	776	10.8	3	73
Experiment 2	×	×	×	×	...	...	..	..
Experiment 3	×	..	×	×	1008	.8	..	8
Experiment 4	..	..	×	×	997	9.7	27	70
Check	..	..	..	..	430	39.4	53	116

Continued on page 33

Bean Double Giant

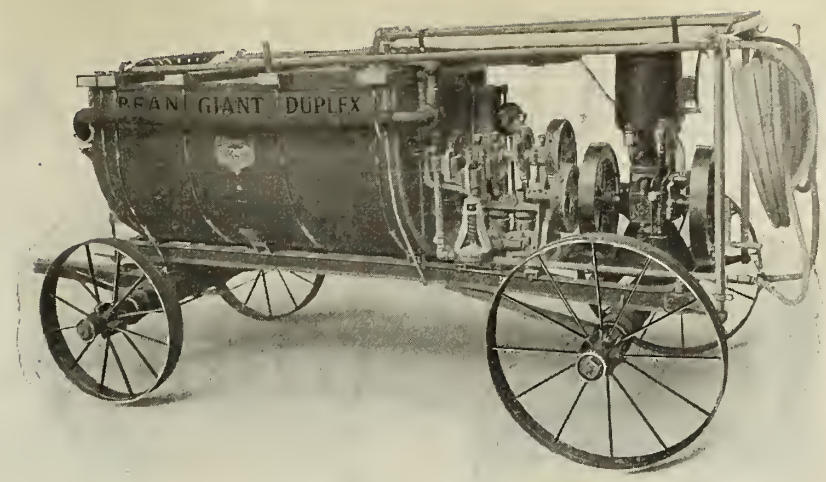
Capacity 25 gallons per minute, 400 lbs. pressure. Supplies 10 or 12 lines of hose.

Bean Giant Triplex

Capacity 8½ to 11½ gallons per minute, 200-250 lbs. pressure. Supplies 2 to 4 lines of hose.

Bean Giant Duplex

Capacity 6 gallons per minute, 250 lbs. pressure. Supplies 2 lines of hose.



Bean Power Sprayers

Bean Little Giant Duplex

Capacity 5 gallons per minute, 200 lbs. pressure. Supplies 2 lines of hose.

Bean Pony Duplex

Capacity 5 gallons per minute, 200 lbs. pressure. Supplies 2 lines of hose. (Overhead suction.)

Bean Eureka Sprayer

Capacity 2½ gallons per minute, 200 lbs. pressure. Supplies 1 line of hose. A one-man, one-horse outfit.

Bean Midget Sprayer

Mounted on skids. Capacity 2½ gallons per minute, 200 lbs pressure. Supplies 1 line of hose.

THE GROWERS IN YOUR SECTION WHO ARE PRODUCING THE LARGEST, CLEANEST AND MOST PROFITABLE CROPS ARE THE GROWERS WHO ARE EQUIPPED WITH THESE STURDY, EFFICIENT, HIGH-GRADE SPRAYERS

The almost universal use of Bean Power Sprayers throughout the Northwest is not merely a matter of chance. It's because the growers of this wonderfully productive section have learned that the Bean is an indispensable factor in the growing of the most and the best fruit. Clean trees are of vital importance—and nobody knows it better than the apple grower himself! It's such advantages as these that have made "Bean" and "best" synonomous with Northwest apple men:

Constant Pressure—Bean Prussure Regulator holds pressure at any desired point. When not spraying engine runs free, thus saving gasoline and wear and tear on engine and pump.

No Stuffing-Box—and hence, no stuffing-box troubles. Our cylinders are equipped with cup plungers.

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A new safety valve embodying part of the features of the famous Bean Pressure Regulator.

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Influence of Pruning On Fruit-Spur System of Apple

By V. R. Gardner, Oregon Agricultural College, Corvallis—Read Before Meeting of Oregon State Horttcultural Society, Hood River, December, 1916

IN presenting this subject, it is my desire to be as brief and to the point as possible. I shall attempt to include no more detail than seems absolutely necessary to a discussion of the fruiting habits of the apple and of some of the more evident relations of certain pruning practices to these fruiting habits. If we are to understand how to prune so as best to develop the fruiting habits of our trees, it is desirable that we should keep clearly in mind an ideal toward which we should work. The ideal fruit tree is one that bears regularly large quantities of high-grade fruit and at a reasonably low cost per unit of production. How may proper pruning aid in realizing this ideal? What are the pruning practices that help or hinder in attaining it, and why do they help or hinder?

Let us first consider the fruiting habits of the apple. Flowers appear in the spring from buds produced the season before. Not all the winter buds, however, unfold and produce flowers. Some give rise to new-shoot growth only. It is often possible to tell from inspection during the fall or winter which buds are to give rise in the spring to flowers and fruit and which to new shoots. If we study the fruiting branches of the apple somewhat closely, we will note that in the case of many varieties (e. g. Spitzenberg, Grimes, etc.) flower buds are to be found only upon short woody branches, lateral to the main direction of growth. Such short woody branches we call spurs. In the case of young trees of certain other varieties (e. g. Rome, Gano, etc.) they are to be found for the most part laterally upon the shoots of the past season; though, generally, as trees of these varieties become older they gradually come to bear upon spurs. At first thought it may seem to be a point of little significance that young trees of certain varieties produce their fruit buds, and consequently their fruit, upon shoots instead of spurs, or upon spurs instead of shoots. However, it will be seen to be a matter of considerable importance, especially with varieties that bear only upon spurs, when it is realized that certain pruning practices result in practically eliminating the fruit-spur system from the trees. Other pruning practices that tend greatly to develop the fruit-spur system and to correspondingly check shoot growth may be almost equally harmful for young trees of varieties that at that time bear mainly upon shoots. From these statements it becomes evident that one of the first things the owner of a young orchard should do is to determine by which method the variety or varieties he is growing bears the bulk of its fruit. Since the larger part of our apple varieties produce the bulk of their early crops upon fruit spurs, and since practically all varieties bear their later crops in this manner, this article will concern itself wtih the way in which fruit-spur formation and fruit-spur functioning is influenced by various pruning practices. This is far from stating that the influence of pruning practices upon the formation of lateral buds upon shoots is not important. It is an important question for the owner of a young Rome or Gano orchard to consider, but time will prevent its discussion here.

If good fruit spurs are so vital to the bearing of satisfactory crops, it becomes evident that pruning and cultural practices should be such as will tend to develop and maintain an extensive and efficient fruit-spur system. Let us first inquire as to when and where fruit spurs arise. Do they develop on the new growth, on the growth of the past season, or from older wood? Do they develop more

readily upon shoots in certain portions of the tree than upon shoots in other portions—and if so, why? Are they more prone to develop from certain portions than from certain other portions of the same shoot? These are not merely academic questions, for the results that we obtain from our pruning practices very largely depend upon their answers. Fortunately we are not without answers to some of them. Careful examination will show that practically all spurs starting to develop any one season start out from shoot growth of the season before. A few develop from shoot growth of the current season, i. e. from the new wood, but the number developing in this way is comparatively small. Very rarely do we find spurs developing from wood older than the past season's growth. Just why this is true it might be difficult fully to answer, but the fact remains that it is only in exceptional cases that buds that were formed during, say, the season of 1910 develop into spurs later than 1911. That is if spurs do not start to develop from them in 1911 we cannot expect to obtain spurs from them in later years. They may grow out into shoots in later years, under the stimulus of very heavy, pruning, heavy fertilization, etc., but they are not apt to develop into fruit spurs. This fact should carry an important lesson for the fruitgrower, for it means that if he is to have fruit spurs in the lower and interior part of his tree he must develop them when the tree is young, when that part of the tree is year-old growth. If the interior part of the tree is prevented from developing fruit spurs by too severe pruning, or if spurs once formed there are broken or pruned off, it is practically impossible to develop them there again, except indirectly upon new sucker or shoot growth that may be encouraged. The fruitgrower should come to look upon the shoot growth of his trees as material that is capable of yielding fruit spurs directly only for a year. If it does not furnish him fruit spurs within that period it loses its value as fruit-producing wood and is useful simply as a support for newer wood that may produce fruit.

From what has been said one would infer that the question of whether or not the lateral buds of a shoot are, or are not, to develop into spurs is more or less under the grower's control. This is actually the case. Examination of the buds along an average apple shoot will disclose the fact that some are very small and poorly developed. They look as though they may have been poorly nourished. Others are large and plump, giving evidence of being strong and vigorous. If such a shoot is observed as growth starts in the spring, it will be noted that usually it is only the large plump buds that push out and form new shoots and spurs. Should the small weak buds "break" under the stimulus of heavy pruning, it is generally shoot growth rather than spurs that develop from them; and if they "break" and form spurs, and spurs are weak and soon die out or cease to grow. In other words,

it is only the strong, vigorous buds on shoots that are apt to make strong, vigorous fruit spurs. Close observation in the orchard will reveal the further fact that it is those portions of the shoot that are most exposed to the sunlight—namely, the upper and outer portions—that develop strong, large lateral buds. It naturally follows that it is from these portions of the shoot that most of the fruit spurs may be expected to devolp; and, as a matter of fact, do develop.

With these points in mind let us see how several of the more common pruning practices modify or control the formation of fruit spurs. First let us consider the influence of winter heading back of the shoot growth of the past season—a practice constituting well over fifty per cent of the pruning afforded our orchard trees. The immediate result is to remove the terminal one-half or one-third of the shoot—the one-half or one-third that has most of the large, vigorous lateral buds possessed by the entire shoot and that normally would grow out into fruit spurs. This leaves few buds from which spurs may be expected to develop, and this means that the major part of the energies of the tree will be expended in the development of new shoots from the smaller and weaker lateral buds that are left. Such shoots, coming as they do from adjacent joints or nodes, come into close competition for light and air, crowd each other, and grow out and up toward the light. This in turn forces the formation of the large plump buds that are to give rise to the fruit spurs of another season far up or out on the shoots, where the light supply is a little more abundant. Heading back these new shoots the following winter again removes a large percentage of the buds that otherwise might develop into fruit spurs and stimulates the formation of another crop of shoots that again crowd each other, and with the same general results. Heavy heading back then tends to reduce greatly the number of new fruit spurs—(1) through the removal of buds that would normally grow out into spurs; (2) through forcing into shoot growth the weak buds toward the base of the shoots; (3) through leading to the greater crowding of the new shoots and thus weakening their lower buds and pushing out still further (terminally) the area of the new shoot that develops strong spur-producing buds. It requires little study to see that a moderate or a light heading back, while operating in the same general direction, exerts a correspondingly less powerful check upon fruit-spur formation.

Thinning out of shoots during the dormant season, on the other hand, has an effect upon fruit-spur formation almost opposite from that of heading back. It is true that thinning out removes a number of the large well-developed lateral buds that otherwise might form fruit spurs; but the proportion is not so great as in the case of a heading back that is equally severe, because most of such buds are located

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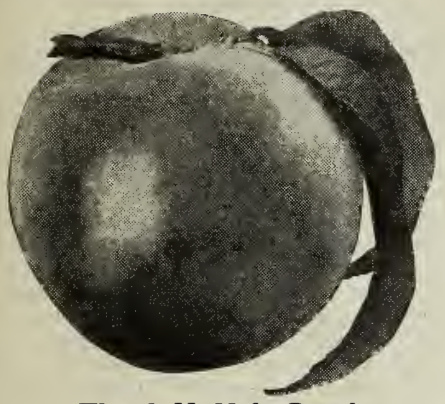
There's Money in the J. H. Hale Peach Where Others Have Shown No Profit



The J. H. Hale Peach

It will ship a thousand miles farther, bears when others fail, and brings the highest prices. It has outyielded and outsold Elberta and other peaches in carload lots in the country's greatest market. Wm. P. Stark recognized its merits and has propagated and sold it to satisfied growers in every section. In a few years you, too, will be much pleased if you plant them now.

Size. Averages ⅓ to ½ larger than Elberta.

Color. Golden yellow, overlaid with bright carmine.

Flesh. Solid, fine grained, tender, delicious flavor; perfect freestone.

Shipping. Only peach ever shipped in a barrel like apples. One crossed the continent twice and was received in good condition. Has kept 53 days in ordinary ice-box.

Ripening Season. Three days to a week ahead of Elberta.

Picking Season. Extended at both ends. Colors before ripe and hangs long on the tree.

Hardiness. Fruit buds are hardier than any large fine yellow peach. Has stood drouth and severe cold when others in same orchard failed.

Profits. Mr. Hale received $1,420 from one acre. It has always brought him the highest prices alongside of the highest grade Elbertas.

Exclusive Contract. After testing this wonderful peach for 12 years, Mr. Hale was at last willing to have it bear his name. He contracted with Wm. P. Stark Nurseries to propagate and distribute this peach. The genuine, registered trademarked J. H. Hale peach trees can be furnished only by the Wm. P. Stark Nurseries.

Read These Letters From Experts

From California. "The J. H. Hale is a very handsome, shapely peach. The fruit is fully ripe and juicy and its control of its own decay in a close mail package is very significant of its keeping quality. It is a very heavy, fine-fleshed peach, coarse fiber almost absent. The flesh is solid yellow to the pit wall, no excess of red color at the pit and no cavities around it. The pit cavity has, however, a deep rich red —a perfect beauty for varieties in which this coloring is desirable. If vigor and bearing prove satisfactory, I believe the variety will have exceptional value in this state. If, however, it persists in being as much larger than the Elberta as is claimed, it will be hard to hold with one hand in California."—Prof. E. J. Wickson, University of California.

29 Days in Storage. "J. H. Hale peaches picked 29 days and in common storage, still good."—A. V. Underwood, Dufur, Oregon.

Fully Up to Your Claims. "One of my J. H. Hale trees bore ten peaches, one of which weighed nine ounces. Beautiful they were, flamed with vivid red and clear yellow. Good? Be assured they were fully up to any claim made for them. I have the fullest faith in the J. H. Hale peach for the home orchard and commercial planting. Shall be very glad to refer any who come this way to the J. H. Hale peach."—Geo. J. Streator, 254 Seaside Ave., Santa Cruz, California.

The Export Peach. "Another peach season has passed, and has been a success from every point of view. I have watched my two-year-old J. H. Hale orchard with lots of interest and on the whole am now more enthusiastic than ever, for while the buds showed much greater winter hardiness than Elbertas as I wrote you in the spring, I did not tell you that this region had a bad attack of curl leaf in the spring and all Elbertas not properly sprayed lost their foliage and crop, while hardly a leaf was affected on the J. H. Hale. Also, the fruit which showed on many of the two-year olds was fully as fine as our finest Elbertas which is remarkable for two-year-olds.

I have tested its keeping quality and I am now sure that, as I have stated before, it will carry a thousand miles farther than Elberta, and I can see that the picking season can easily be extended about ten days in advance of Elberta, and as much later."—Roland Morrill, Benton Harbor, Michigan.

Fine Shipper. Our three-year-old J. H. Hale trees averaged fifteen to twenty peaches to the tree. These peaches were 10¾ inches around, and weighed 10 ounces each. Far better quality than Elberta. We are so far from the market, the J. H. Hale will make a fine shipper, and it is very hardy."—H. A. Budgell, Yakima County, Washington.

Remarkable Endurance. "But these peaches would have gone from California to New York, could have been sent back to California and again to New York—three times across the continent with a margin of three days for examination, admiration and sale! And no refrigeration called for."—Parker Earle, Pasadena, California. (Note—Mr. Earle is a director of the Redlands Heights Ranch Co. They set out an initial planting of 14,000 J. H. Hale trees.)

The Delicious Apple

Always Brings Highest Prices

William P. Stark was the first to recognize the merits of this great apple. He named it "The Delicious" and had the foresight and courage to propagate it and to urge growers to plant it. Its great beauty, delightful flavor and fragrant aroma, make a lasting impression on the mind of the consumer.

Its vigor, hardiness, productiveness and shipping quality delight the grower. It is a consistent, top-notch money maker.

"The Delicious is in great demand here. One orchardist with 51 trees picked 259 boxes for which he received $2.00 a box here at home. He could easily get $2.50 for them."—R. S. Purtee & Son, Paonia, Colorado.

"I have on hand a bushel of Delicious apples for which I paid the small sum of $4.00."—Alfred Bonsecours, Topinabee, Michigan.

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BETTER FRUIT

HOOD RIVER, OREGON

Official Organ of The Northwest Fruit Growers' Association
A Monthly Illustrated Magazine Published in the Interest of Modern Fruit Growing and Marketing
All Communications Should Be Addressed and Remittances Made Payable to

Better Fruit Publishing Company

E. H. SHEPARD, Editor and Publisher

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THE EXPERIMENT STATION OF THE OREGON AGRICULTURAL COLLEGE, CORVALLIS, OREGON.

The work of the Experiment Station and its results have a bearing upon the prosperity of the state, which is little understood by most members of the Legislature for the reason that the majority of legislators are lawyers, business men and professional men, only a small number being farmers and fruit growers. The work of the Experiment Station has to do almost entirely with farming, stock raising and fruit growing and products of the soil, of which business and professional men have very little knowledge of, consequently they are inclined to look on the Oregon Agricultural College and Experiment Station as purely an educational institution, fealing to realize that the Experiment Station is a big factor in contributing to the success of the farmer, fruit grower, the stock raiser, dairyman or poultry man. The Experiment Station has scientifically trained men for studying all diseases of stock and poultry, issuing bulletins on the treatments of the same, as well as the care of stock. They are conducting experiments for the purpose of ascertaining what varieties of seeds are best suited to climates and soils in the different sections of the state. In fruit growing the Experiment Station is conducting experiments for the purpose of ascertaining how to control the different pests and eradicate the different diseases, which all kinds of fruits are subject to. There are many diseases and problems to be worked out in connection with these different phases of farming, fruit growing and stock raising that may not be solved in two years, and may require several years.

The Editor of "Better Fruit," being a fruit grower of thirteen years' experience in Hood River Valley, feels he can speak more intelligently upon the value of Experiment Stations to the fruit grower than to the general farmer. On the other hand, there are many general farmers who could explain the value of the Experiment Station to the farming industry or stock industry far more effectively than the Editor of "Better Fruit." However, it remains a fact that the Experiment Station at Corvallis has conducted a number of experiments and developed methods for controlling diseases and pests or increasing yields that have added hundreds of thousands, perhaps millions, of dollars to the State of Oregon, which in a general way has contributed to the general prosperity of the state, in addition creating hundreds of thousands of dollars more business in the way of farm and fruit products that cannot be covered in a short editorial. The benefits derived by the farmers and fruit growers are so many it would take a full page in "Better Fruit" to cover this subject in a partial way. However, it is hoped one or two illustrations may be sufficient to prove the value of Experiment Stations, at least to the fruit industry.

The apple crop of the State of Oregon is estimated at four or five million dollars for 1916. If it had not been for the information furnished by Experiment Stations through bulletins on spraying for San Jose scale there would not be an apple tree or fruit tree left today in the State of Oregon. If it had not been for the bulletins, demonstrations and instructions given on spraying for codling moth the apple crop of the State of Oregon, worth $5,000,000 in 1916, would not be worth 50 cents, because it would have been absolutely eaten up by the worms.

In all sections of the State of Oregon, except Eastern Oregon, there is a disease of apple trees known as anthracnose. This disease got a start in the State of Oregon a few years ago, making rapid havoc of the orchards. It was not known how to control it. A process of control and eradication was worked out by Dean Cordley. A practical demonstration was made in the orchard of Eisman Bros., Grants Pass, after the disease had got a good start. The Editor saw this orchard after it had been saved, loaded with a crop worth several thousand dollars. Since that time anthracnose has developed in a number of other sections throughout the state, which have all been saved by the method of treatment worked out by Dean Cordley of the Oregon Experiment Station. This method is generally used for the control of anthracnose throughout the entire world today. There is another disease known as fungus, more commonly called scab, which attacks apples, particularly in humid climates. Up to a few years ago the general method of treatment was bordeaux, which prevented the apples from being scabby, but under rainy conditions caused them to be so russeted they were unmarketable. Again the Oregon Agricultural College shines out as a saver of the fruit industry, as Dean Cordley, through several years of experiment work, developed a treatment of lime and sulphur which protected fruit from fungus, without injuring the fruit. The apple crop in Hood River Valley alone will amount to over $1,500,000 for the year 1916, all of which was sprayed under the direction given by the Experiment Station, being practically free from fungus. Without the method of treatment discovered and worked out and recommended by the Experiment Station through Dean Cordley and his assistants, the apple crop of Hood River on account of scab would have very little, if any, market value.

When an Experiment Station starts in to work out a process for the control of diseases, it can be readily understood that they cannot tell how long it will take. It may take two years; it may take four or six years; therefore the Experiment Station needs a continuous appropriation for the purpose of completing what they have started to work out. Without a continuous appropriation they cannot undertake to work out and complete experiments within the limit of the present appropriation of two years. On account of the excellent work that has been done by the Experiment Station in the State of Oregon, the editor feels justified in recommending in a most emphatic way possible that he Experiment Station of Oregon is entitled to adequate appropriation and continuous appropriation. The editor of "Better Fruit," in behalf of the fruit industry of the State of Oregon, worth many millions of dollars, believes that the Experiment Station is entitled to the fullest support of the Legislature. It is the earnest request of "Better Fruit," in behalf of the fruitgrowers, that every member of the Legislature take sufficient time to investigate for himself the work being done by the Experiment Station, and if not posted on what is being done to inquire of someone who is familiar with what is being done and what the Experiment Station is expected to do. Without the scientific knowledge in possession of the fruitgrowers at the present time obtained through the Experiment Station the crop of fruit in the State of Oregon amounting to $9,000,000 this year, in all probability would not be worth marketing. The Legislature cannot afford to ignore or pass up any adeqaute appropriation for an institution like the Oregon Agricultural College and Experiment Station.

Spraying.—In 1915 the growers suffered a very severe loss by inefficient spraying. By inefficient spraying is meant poor workmanship, lack of necessary applications, poor material, omission of applications at the right time, too weak strengths, etc. The serious loss of 1915 was an object lesson, consequently in 1916 the growers seemed awakened to the situation, doing pretty generally a first-class job in proper shape, the result being a clean crop with very little fungus, and very few stings. A clean crop cannot be obtained if any spray on the program is omitted. Having obtained clean crops in 1916 the growers should profit and remember that it is thorough work that gets results and spray accordingly in 1917. In 1915 growers varied in fungus all the way from 5 per cent to as high as 90 per cent. In 1916 very few exceeded 5

per cent of fungus. But it must be remembered that in 1916 the growers used four times as much fungicides as in 1915. In 1915 in some districts the per cent of loss from codling moth ran as high as 25 to 30 per cent. In 1916 the loss from codling moth was comparatively small. Growers should not omit any spray for codling moth. In some districts clean crops can be obtained on three sprays under normal conditions. In some districts five sprays show the best results. Generally speaking, a spray, including the cost of material (one material) and labor, will cost about one cent per box per time, with a good fair average yield. The grower cannot afford to risk from ten to fifty per cent of his crop by omitting any one spray which only cost one cent per box. While there is good sense in the statement that a spray of moderate strength, thoroughly applied, will produce better results than a stronger solution inefficiently applied, growers should be careful in their idea of economy and be sure that the solution has sufficient strength to control. In this connection the editor desires to call attention to the fact that there are many scientists who recommend arsenate of lead at two pounds to a hundred; some advise three pounds to a hundred; manufacturers usually advise four pounds to a hundred. In 1904 Dr. E. D. Ball, then Director of the Experiment Station at Logan, Utah, now at Madison, Wisconsin, gave to the fruitgrowers the most interesting data on spraying for codling moth that had appeared up to that time, stating that where less than five pounds to the hundred gallons was used the codling moth damage exceeded by far the saving in the cost of material. The editor has constantly followed this program ever since, producing crops about as free from codling moth as any grower. This year the editor again used five pounds to one hundred gallons in his sprays. The number of stings being so small that it was impossible to figure it in percentage. To give some idea of how free from stings the editor's crop was, one of his pickers picked two days, which would mean 100 boxes, only finding one sting. The editor of "Better Fruit" is a strong believer in five pounds of arsenate of lead to the hundred. However, he is willing to admit that under certain conditions some growers may be able to secure satisfactory results with less. The editor is not giving advice, because every man must decide what spray material to use and the strength to apply. The editor gives you his opinion and the results obtained for such consideration as you see fit to give it.

The Novo Engine Company, Lansing, Michigan, manufacturers of gasoline engines, which are used extensively by farmers, has just announced they have presented to their employes their second annual dividend.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

Influence of Pruning, Etc.

Continued from page 16

on the terminal portion of the shoot. If these strong, potentially spur-producing buds were evenly distributed between the basal and terminal half of each and every shoot, it is evident that a 50-per-cent thinning would remove exactly as many as a 50-per-cent heading back; but on the other hand, that if all such buds were located on the terminal half of each shoot the heading back would remove them all, while the thinning out would remove only half of them. These are extreme cases, but they at least serve to illustrate the general tendency of the two practices so far as concerns the removal of spur-forming buds. Furthermore, there is an equally great contrast between the results that follow thinning as compared with heading in the influence of the two practices upon the location, or distribution, of such buds upon the new shoots. Just as heading back tends to increase the amount of new shoot-growth, concentrate it in a smaller area, lead to crowding and thus through shading to a pushing out toward the end of the shoot the area that produces large plump spur-producing buds; so thinning out tends to decrease relatively the amount of new shoot growth, distribute it over a larger area, avoid crowding and thus, through providing better light conditions for the basal portions of the shoots, lengthen the area that produces spur-producing buds and bring it closer to the base of the shoot. Naturally the effects of light or moderate thinning out upon fruit-spur formation may be expected to be less pronounced than those following heavy thinning.

From the statements that have just been made, it might be inferred that because we desire a large number of fruit spurs in the apple tree and because the tendency of winter thinning is to encourage their formation while that of winter heading is to check or reduce it, thinning out is the only pruning practice to be recommended and heading back is in all cases to be avoided. Even though such recommendations were made few practical fruitgrowers would be inclined to follow them, at least without some modification, for they know that constant thinning out coupled with no heading back eventually would result in the development of loose, straggling trees—trees weak mechanically, even though they might possess sufficient spurs for large crops of fruit. Is there not some way, then, of keeping the apple tree fairly compact and still not invite the evils attendant upon the severe winter heading back that is practiced so commonly? Investigations of the Oregon Experiment Station extending over a number of years lead to our recommending a certain type of summer pruning to obviate this difficulty. It has been found that an early summer pruning (about July 1) of young apple trees is followed by a secondary late summer-shoot growth that functionally closely corresponds with the terminal half or third of shoots on trees that are not summer pruned. That is, this late

summer secondary shoot growth normally produces large, plump lateral buds that the following season are prone to grow out into fruit spurs. Furthermore, this late summer shoot growth of summer-pruned trees is generally advantageously placed in the tree, and it is not apt to be so long that much heading back is required during the following dormant season. The result is that the tree under this pruning treatment rapidly develops a fruit-spur system because this secondary shoot growth becomes covered with fruit spurs the year following its production. At the same time there is no tendency for the tree to become straggling in form. It is a method of procedure enabling the preservation of all the good effects resulting from thinning, for there is a vigorous thinning both at the time of summer and of winter pruning, and the avoiding of the evil effects of heading back, because the heading back is done at a time of the year when it does not remove the portion of the shoot that is most prone to develop fruit spurs. This latter combination, then, is the pruning treatment that we recommend for the quick development of a vigorous and extensive fruit-spur system in young trees of varieties that normally bear upon spurs from the start. It will be understood that it is not a pruning treatment recommended for varieties that at first normally bear mainly upon shoots. It will be understood, also, that it is not a pruning treatment that is recommended for older trees that have been bearing good crops for a number of years and necesarily have already developed an extensive fruit-spur system. With them the object should be to keep their old spurs strong, vigorous and productive rather than to promote the formation of a great many new ones. Pruning treatment that will best promote that object will be discussed later. Before leaving this subject it may be well to call attention to the fact that the proper timing of this summer pruning is an important matter. It should be given comparatively early in the growing season. If delayed until there are signs of terminal-bud formation in the main shoots, little or no secondary shoot growth will be produced. On the other hand, if done too early in the growing season equally unsatisfactory results are apt to follow. The best time seems to be when shoots of the current season have obtained one-half to two-thirds of their normal length. The exact time will vary with variety, location, season and many environmental factors.

The statement was made that the ideal fruit-spur system is not only an extensive system, but a productive system. At first thought it might seem that productiveness is correlated with age. However, recent investigations have shown that old spurs are neither more nor less efficient than young spurs on account of their age, for many old spurs are regular producers of high-grade fruit. On the average they are less efficient, but less efficient because less vigorous. What, then, are the factors influencing the productiveness of the individual fruit spur. A careful study during the growing season of the fruit-spur system of almost any old apple tree reveals the fact that it is in the more densely shaded portions that we find the majority of the weak and dying spurs. Light supply is undoubtedly not the only factor influencing the vigor of individual fruit spurs, but it is plain that it is an important one. The influence of heading back and of thinning out upon light supply, and consequently upon spur formation from buds on the basal portions of shoots has already been pointed out. It is evident that these two practices would lead to equal, or even greater, differences in the light supply reaching already established spurs in the lower and interior portions of the tree. Therefore, we would expect more vigorous,—because better lighted,—spurs in the tree receiving much thinning; and this would be true whether the thinning is limited to the new shoots or is extended to the older wood. On the other hand, we would expect weaker spurs in trees receiving much heading back, even though at first thought it might seem that this practice would tend to divert a certain amount of food material into the spurs lower down in the tree. It should be remembered, however, that it is elaborated food materials, such as are received from well-developed leaves, rather than raw food material, such as are received from the roots, that induce fruit-bud formation and fruiting; and heading back would have more of a tendency to divert raw,

rather than elaborated food materials into the spurs. That our expectations in this matter square with the facts is evident to one who will go to the orchard and carefully compare the fruit spurs of severely thinned with those of severely headed trees. Thinning out, then, would seem to be a practice that not only encourages the formation and development of an extensive fruit-spur system in the apple, but that operates to keep that system in a strong, vigorous and thrifty condition. In this connection it may be worthy of note that these results may probably be expected to follow summer as well as winter thinning. On the other hand, heading back during the dormant season would seem to be a practice that not only checks fruit-spur production, but tends to weaken and devitalize already established spurs. From this it is evident that thinning out should come to occupy a more prominent and heading back a less prominent place in the pruning of both young and old apple trees.

This is far from stating that apple trees just coming into bearing or that have been bearing for a number of years, should not be headed back. As stated before, summer heading back may well have a place in the development of the young tree, especially when coupled with both summer and winter thinning out. Furthermore, it is often desirable to head back the limbs in old trees so as to force out new shoots lower in the tree—shoots upon which new spurs may be developed to replace those in the older portions of the tree that have been destroyed through one agency or another. As a matter of practice it will generally be found that the average tree requires a certain amount of thinning out and a certain amount of heading back in order to develop the most efficient fruit-spur system. Just how much of each type or kind of pruning to give in each case cannot be told any article on the subject. These are questions that must be settled for each tree at the time of pruning, but they are questions that should not be settled in haphazard fashion. The correct answer to them depends first upon accurate judgment regarding the tree's condition and its needs and then in a sound knowledge of how distinct pruning practices will modify those conditions and meet those needs. It would seem to the writer that this series of questions should flash through the mind of the pruner before he prunes any apple trees: (1) Does this tree at this age bear mainly upon spurs or upon lateral buds or shoots? (2) If it bears upon spurs, are there enough or too few or too many? How severe and what kind of pruning will just maintain, increase or decrease their number? (3) Are the older spurs becoming weak and dying out? (4) How severe and what kind of pruning will invigorate them? (5) How can I maintain the desired shape of tree without injuring the fruit-spur system? Let these questions be seriously considered and there will be made fewer expensive mistakes in the pruning of our fruit trees.

The Fruit Growers' Agency, Inc.

By Paul H. Weyrauch, President.

THE Agency was organized on March 26, 1916, with a membership representing approximately ten thousand cars of apples and other fruits grown in the four Northwestern States.

The general plan was suggested by representatives of the Office of Markets after a thorough investigation of the conditions existing in the Northwestern States. Activities have been carried on with the purpose of bringing about co-operation among the numerous selling agencies in the solution of problems common to the industry.

The Office of Markets has played an important part in the work of organization and also in the work of the Agency. Our chief activities may be summarized as follows:

1. The securing of reliable information as to crop conditions.
2. The establishment of a reliable market news service in conjunction with and with the assistance of the Office of Markets.
3. Providing for uniform methods in the harvesting, grading, packing and physical handling of fruit.
4. The standardization of account sales so as to establish a feeling of confidence between grower and shipper.
5. Working toward improvements in transportation service and storage.

In conjunction with state officials two crop estimates were issued. The first estimate was published on July 3, 1916, and a revised estimate was given out on September 1, 1916. These estimates were prepared with great care and the actual number of cars shipped to date would seem to indicate the approximate accuracy of the estimates.

A market news service was established in the office of the Agency at Walla Walla early in August to report upon soft-fruit shipments. This service was of especial value in the movement of the prune crop. This service was in charge of a representative of the Office of Markets. About September 15th the Market News Service was transferred to Spokane in order to enable the office to more easily reach the various fruit centers. The Spokane office was opened by representatives of the Market News Division of the Office of Markets. Two daily reports were published. The first report was of a general nature, giving information concerning crop movement, telegraphic information from different markets of the East and South as to market conditions and quotations. This report was sent to anyone interested in it. A second report was sent out, being confined to shipping members of the Agency and to those non-members who agreed to contribute the information necessary to make up the report. This report furnished a tabulated statement of orders booked, giving variety, grade and price, also destination; shipments on previously booked orders, and movement of cars rolling, with information as to rollers sold.

The matter of providing for uniform methods in the harvesting, grading, packing and physical handling of fruit is now in the hands of a very competent committee, and the next season will see the inauguration of some of the plans that are now being worked out. Here again the Office of Markets has been of great assistance, and two of its experts have made a thorough survey of conditions. As a result a temporary inspection service was established at Fort Worth and Dallas, where cars are now being inspected and reported upon.

The importance of keeping accurate records and accounts has not in the past received the attention to which it is entitled, and a great amount of work has been done within the Agency to secure recognition for this most important and indispensable branch of any industry. A Committee on Account-

ing and Business Practice, working in conjunction with a representative of the Office of Markets, has investigated and made a study of the system of accounting in thirty-seven shipping organizations located in the Northwestern States. A uniform account sales has been devised, which is now being used in twenty organizations who are all members of the Agency. A system of accounting for fruit-shipping associations has also been devised and installed in seven organizations for experimental operation. A study is being made of the cost of packing house and warehouse operation, also of questions of financing, pooling, grouping of sizes and office and warehouse procedure in general.

A number of important transportation problems have also had the attention of the Agency. The following may be mentioned as some of the matters taken up:

1. Diversion privileges to Canadian points for Northwestern fruit. This privilege has been granted by railroads interested.
2. Adjustment of diversion charges.
3. Storage-in-transit privileges into certain Eastern points.
4. Precooling and original icing by shippers.
5. Transportation rates on ocean freight.
6. Adjustment of rates into Southeastern territory. These rates have already been published by the interested carriers in response to our request.

Through the activities of the Agency the state governments of the four Northwestern States have also been interested and the governors of these states have appointed a joint commission to work in conjunction with the Agency in matters pertaining to the fruit industry. This commission has recently held several meetings and has passed the following resolution:

"After holding public hearings for two days with representative growers, shippers and others interested in the fruit-marketing problem in the States of Washington, Oregon, Idaho and Montana, the Joint State Commission of Fruit Marketing, appointed by the governors of the several states, has tentatively arrived at the following conclusions:

"It is recognized by the commission that the fruit industry of the four Northwest States is in sore need of financial assistance from federal and state agencies to assist in a thorough organization of the fruitgrowers, and that the several states should work in hearty co-operation with the Federal Office of Markets in perfecting the organization of growers. We suggest that the federal government be asked to give additional funds and that the several states be asked to appropriate money to bring about the necessary co-operation with the federal government.

"We further recognize that a substantial step toward the solution of the marketing problem in the box-apple industry of the Pacific Northwest will be made through the passage by the several legislatures of laws providing for official state standardization of grades and packages, with a state system of packing-house inspection and official certification for the protection

of the grower, wholesale buyer and consumer."

The Agency has been organized less than nine months and its total expenditures to date are slightly more than five thousand dollars. Within the short time available and with the limited funds at hand it has been the means of bringing into closer co-operation the more important factors in the fruit industry of the Northwest. Its work has been of great value in the dissemination of crop information, in the establishment of a reliable market news service, in its work toward securing better accounting systems, and in its activities in the adjustment of transportation problems.

The program of the Agency must appeal to everyone interested in the industry, be he grower, shipper or receiver. Under its supervision and guidance all legitimate factors in the industry will be properly protected, and it should receive the support of everyone who has the real interest of the fruit industry at heart.

My Experience in Land Clearing

By Thomas Cunningham, Farm Manager for the Western Fuel Company.

IT is my intention in this article to deal particularly with the actual work of land clearing. Much has been said and written on the subject, and still land clearing remains an arduous task. To get down to hard facts: There is on each acre of land a given quantity of wood to extract from the ground and burn. There is also a given quantity of soil to handle in grading and leveling the ground to make it suitable for farm implements to do their work on. All this work requires power to accomplish, whether it be machine power, horse power, manual labor or explosive powders. We cannot get away from these facts.

Stumping may be divided into five distinct methods: By burning in the ground, destroying by chemicals, digging out by manual labor, by blasting and then burning or by pulling the stumps and then burning.

Pulling and Blasting Methods Combined.—In an experience gained by clearing some four hundred acres of land I have come to the conclusion that a combination of the two last named methods is the only practical way to clear land. That is to say: Pull out the smaller stumps whole, then blast the larger stumps and pull out the remaining portions, if any, and burn.

Hand-Power Stump Pullers.—Very recently I gave a demonstration on stump pulling to the members of the Royal Commission on Agriculture, appointed by the government of British Columbia. In this demonstration I attached a hand-power stump puller to a fir stump about 20 inches in diameter. This stump was on an open gravelly soil, and the roots penetrated quite deep. I pulled it out quite easily in seven and one-half minutes, the roots being pulled out clean and clear. While pulling the stump (as is my usual custom) I kept a man with a mattock knocking the dirt from the roots as the stump was raised and allowing it to fall back into the hole made by lifting of the stump. By doing this the ground is left nearly level and requires very little grading afterward. Naturally, the members of the commission were greatly delighted with the machine, and in order to personally test it Mr. Hayward, M. P. P., chairman of the commission, and Mr. Shannon, one of the members, took hold of the lever and pulled out a stump themselves.

The main points of advantage to the farmers about these machines are: Their low cost places them within the reach of all; their cost of operation is small, as they can be operated by one, two or three men, as desired; the cost for repairs is practically nothing; their light weight allows of their being easily and quickly moved from one point to another; there is no heavy hauling back of cable, thus making changes from one stump to another very quickly; the slow-traveling movement of the pulling cable allows time for the roots to worm themselves clear of the soil, thus making a clean extraction of all roots; they will pull as large or larger stumps than any of the makes of horse-power or steam-power devices, and the high-speed gear will pull small stumps very fast.

Briefly speaking, the method I find most satisfactory in land clearing is to first clear off all underbrush or second growth. Next remove all valuable logs and dispose of them. Then pile and burn all valueless logs. Next pull out whole all stumps up to about 20 or 22 inches diameter, always keeping a man knocking the soil off the roots as the stump is being pulled. Then blast the larger stumps and pull out any remaining roots. Then pile and burn and the land is ready for rock picking and plowing.

SEASON'S GREETINGS

"Better Fruit" has received a number of Season's Greetings, which have been unusually attractive, typographically and artistically, as well as beautiful in sentiment, indicating a feeling of prosperity and good will for Christmas 1916 and New Years 1917. "Better Fruit" desires to acknowledge the receipt of these many remembrances and feels especially pleased and complimented in being honored this way by the largest institutions in the United States. Those received to date are as follows:

The Hudson Motor Car Company, Detroit, Michigan, sends out a large folder, beautifully and artistically done, very handsome in appearance, reminding one of the excellent qualities of the Hudson Super-Six.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

The Blalock Fruit and Produce Company, Captain Paul H. Weyrauch president, Walla Walla, Washington, has a very attractive folder in the form of a Christmas tree, over which is printed the Season's Greetings and thanks for business favors in the past.

The H. K. McCann Company, New York and San Francisco, have an unusually large folder, printed on heavy paper, which is very artistic and handsome and extremely original, being a winter scene with the rooftops covered with snow. A roadway is pictured along which is a procession of people bringing in all the good things to eat and drink that bring good cheer, like venison, casks of rare wine, etc.

E. I. du Pont de Nemours Company, Wilmington, Delaware, have issued a very elegantly engraved card conveying New Years Greetings from the president, Mr. Pierre S. du Pont.

Hicks-Chatten Engraving Company, Portland, Oregon, have a very attractive Christmas folder, beautifully done in rich colors of red and gold, with a snow scene, surrounded by a soft background of pearl gray.

The Union Pacific System have an attractive card of Good Will and Good Cheer Greetings for a Merry Christmas and Happy New Year, with the Union Pacific shield decorated in holly.

The Union Meat Company, Portland, Oregon, have issued an engraved card that is beautiful in simplicity, wishing a Merrie Christmas and Happy New Year.

Mr. John B. Cancelmo, Philadelphia, is the first firm issuing a calendar to be received at this office for 1917. In past years "Better Fruit" has received many calendars, which usually come along about the first of the year, but none surpasses this in elegance. It consists of a head of an Indian Princess in relief, in bronze and gold effect, the colors being very rich. The calendar is conspicuous for its elegance and richness and at the same time simplicity.

The California Chemical Company, Watsonville, California, have issued a very magnificent and attractive calendar especially designed for office use, particularly for a large office, with a very handsome picture in colors, handsome enough for any home, 18x24 inches, the whole calendar being 28x40 inches.

The Pacific Paper Company, Portland, have an attractive small folder, handsomely engraved with an attractive monogram in red on the cover page, with the Christmas and New Years Greetings inside.

The Sprague Canning and Machinery Company, of Chicago, have a handsome engraved card with the "sign of quality" at the top, beautifully engraved in Old English, conveying Christmas Greetings.

The United Lithograph and Printing Company, of Rochester, New York, have a small but very attractive card, decorated in holly.

The Yakima County Horticultural Union, North Yakima, have issued a neat and very attractive card with Christmas Greetings, signed by Mr. Fred Eberle, general manager.

The Novo Engine Company, Lansing, Michigan, has issued an attractive Christmas card, beautifully printed, with a green border, with 1917 in embossed gold letters.

The Produce Reporter Company, Chicago, have issued a very attractive Season's Greeting, artistically decorated with an attractive holly wreath.

Mr. A. C. Rulofson, San Francisco, representing the Pittsburgh Steel Company and the Twisted Wire and Steel Company, sends out a beautifully engraved folder, full of Christmas Good Cheer, expressing high appreciation of old friendships, beautifully engraved and decorated in colors, rendered more attractive by one of the old fashioned Christmas candles and a very handsome picture in colors of a moonlight snow scene.

Farmers' Week Programs—January 22-27, 1917.

The general topics for the daily programs of Farmers' Week will be as follows:

Monday—Horticulture; special attention to problems of potato production.

Tuesday—Farm Crops and Soils.

Wednesday—Poultry.

Thursday—Dairying.

Friday—Livestock with special emphasis on sheep husbandry.

Saturday—"Home Curing of Meat" and "Legume Inoculation," lectures and demonstrations.

Detailed programs will be sent upon request.

Investigation on Spraying for Woolly Aphis 1916

By E. Leroy Childs, Experiment Station, Hood River

[Editor's Note.—Attention is called to the fact that these series of experiments refer to Hood River conditions. In other districts other methods may be found satisfactory. Therefore it is the Editor's suggestion that fruit growers in each district, where they do not understand how to control woolly aphis, should consult with their experiment station or other reliable horticultural experts, who have had experience in controlling woolly aphis and the knowledge of how to do it founded on success.]

WOOLLY APHIS infestations have been rapidly increasing during the last two years in many orchards in the Hood River Valley. This fact makes experimental control work advisable in order that the most advantageous method of control may be determined. Though an old enemy of the apple, and an insect upon which much experimental work has been done, there are many obscure points relative to its life-history and control which demand solution before entirely satisfactory control measures may be developed.

From the preliminary observations made during the past fall we found the insects pass the winter, for the most part, hibernating as nymphs or young insects. On severely-infested trees, countless thousands of the small mite-like aphids will be found under the old bark scales of the trunk and larger limbs. They are also found in large numbers in protected places on the smaller limbs and twigs, especially on twigs which bore a severe infestation during the past year.

Any good contact insecticide will kill these young aphids if it hits them, but owing to their secretive habits it becomes necessary to use a material which will work into these places of protection. Oil applications possess greater penetrating qualities than other contact sprays, and they are therefore recommended for this purpose. Of the oils that may be used, a standard miscible oil is suggested. This material will readily mix with water and the great loss of time that occurs when using crude materials is avoided. Crude-oil emulsion can be used, but often growers will experience considerable difficulty in preparing a complete emulsion. Oil, if not properly emulsified, is liable to injure the trees.

In our preliminary experimental work we have found that the addition of soap tends to increase the penetration and spreading qualities of the oil. The following formula is suggested for use in combating the woolly aphis: Miscible oil, 4 or 5 gallons; whale-oil soap, 2 to 3 pounds; water, 100 gallons. If leaf-roller is present in the orchard, increase the oil to six gallons.

Pruning the orchard before spraying is attempted is found to lessen the work to a large extent. In so doing many of the out-of-the-way twigs and branches which are infested with the insects are removed. These twigs are the ones that are usually slighted when spraying and, if removed, the chances of an immediate reinfestation of the sprayed trees is materially reduced.

On account of the fact that large numbers of the insects occur under the bark scales on the trunks, it is necessary thoroughly to drench this portion of the trees. Hold the nozzle close and apply with a good pressure. Scraping away the old bark scales before making the application, will aid in exposing the aphids. This practice will not only aid in destroying the woolly aphis, but will help to rid the orchard of codling moth.

A Promising Tractor and a Great Harrow

One of the most interesting sights of the great Fremont (Nebraska) Tractor Demonstration was the "latest edition" of the "little Henry" Tractor. While this little tractor is not yet ready to go upon the market it performed nobly at the demonstration.

This double-action engine harrow has 24 18-inch disks and cuts 6½ feet wide, harrowing the soil twice at a single operation. It is sturdily built and strongly braced. The rigid main frame holds each gang to its work—prevents shifting and sluing. The fore disks throw the soil out, and the rear disks cut just midway between the fore disks, throwing the soil back. Thus every particle of soil is thoroughly stirred and left level.

The Cutaway Light Tractor Harrow has adjustable hitch and can be adjusted to any engine. "A chain is no stronger than its weakest link," and it is well to remember that high-grade tractor equipment is quite as important as a high-grade tractor. You'll make no mistake in buying a Cutaway. It has cutlery steel disks, forged sharp, oil-soaked hardwood bearings and is backed by more than half a century's harrow-building experience.—[Adv.]

Coal Oil to the Rescue

On account of the shortage of properly insulated freight cars, the railroads are furnishing to shippers of produce ordinary box cars lined with paper and equipped with kerosene heaters.

The Standard Oil Company informs us that shippers of apples and potatoes, apples particularly, have taken to the idea and are now taking ordinary cars from the railroads and equipping them with heaters. The company's main station at Tacoma, the report says, sold out its entire stock of heaters in a week, to parties in the fruit-packing districts of the Northwest, and still the cry is "more heaters"!

Most of these heaters will go east and never come back, but the fruit crop is moving, thanks to the efficiency and reliability of the modern kerosene heater.—[Adv.]

Packing School for Apple Men

Oregon apple men will be offered an opportunity to study and practice apple packing in a special packing school to be held at the Agricultural College in the second and third weeks of January. Hundreds of carloads of apples will be shipped for the first time from a large number of new orchards just coming into bearing in the Willamette Valley, the Umpqua Valley and in some other districts of Oregon. It is important to the success of the apple industry in these new districts that the first shipments are carefully graded and packed, to give the fruit a good standing. But unfortunately many of the growers will have had little or no experience in grading, packing and handling apples in commercial lots, and it will be very difficult to secure expert help from the leading apple districts. For these reasons, the College Division of Horticulture offers the course in grading and packing. A modern type of warehouse will be equipped for this work and one of the best and most up-to-date apple-grading machines will be used. Conveyors, gravity carriers, such as are being installed in some of the best type of community houses, will be provided. An expert apple packer will be in charge to teach the students apple packing, and sufficient time will be given so that the packers may become fairly expert and reliable. Special attention to the handling of fruit has been given by Professor Lewis, chief of the division, during the last two years, and this information will be made available for the students in attendance. A good supply of apples will be provided and they will be brought to the packing room, where they will be handled according to the best commercial methods. Expense of this will necessitate a very small fee, but the work will be condensed into two weeks. Orchardists unable to attend may take advantage of the work by sending a trusted helper.

Spraying for Pear-Leaf Worm.

The pear-leaf worm, an insect which does considerable damage to pear orchards, especially on the Pacific Coast, is easily controlled by spraying. A contact spray is usually effective in controlling the insect in the larval stage, and should be applied when the blossoming period is about over and two-thirds of the petals have fallen. The following formula for a contact spray is given in a new professional paper of the Bureau of Entomology, U. S. Department of Agriculture: Fish-oil soap, 1 pound; water, 25 gallons; nicotine sulphate (40 per cent concentrate), 1 to 1,200 parts of the spray. When the infestation is severe and promises destruction of the foliage, a poison spray, made of 4 pounds of lead arsenate to 100 gallons of water, should be used. The best time for applying this is when the holes in the leaves are not larger than one-half inch in diameter.—Office of Information, United States Department of Agriculture.

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Dust Spraying

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the other advantage of making an application when it would be impossible to apply the liquid, and this often means the saving of a crop. So, with these two points standing out, as well as other advantages, I believe the dusting method has merits which warrant the consideration of any progressive fruitgrower.

I want to say here that in comparing the dusting method with the liquid method of spraying, it is not a fair measure of comparison to test them side by side the same as you would two liquid sprays. For, if the liquid could be put on at all times when it should be put on, the need of the dust spray would be less apparent. The beauty of the dust spray is that it can be put on at times when it would be impossible to put on the liquid, either because of weather conditions or of shortness of time. Therefore, if the dust is applied only at given times when the liquid is applied, results may show in favor of the liquid. But, even for sake of argument, should the dust be less effective than the liquid spray when applied on identical dates, there do come times when the whole value of an orchard crop depends upon spraying. Weather conditions or time limit prevent the application of the liquid and the crop is partially or wholly lost. The dusting method overcomes this and allows of application when the liquid spray has no value whatsoever. In this, in large measure, lies the efficiency of the dusting method,—and yet, as a matter of fact, orchards dusted in the same thorough manner as the liquid is applied, are showing quite equal results against apple scab, and superior results as against codling moth and some other insects and diseases. It is absolutely essential to have the materials very fine, and when a carrier is used, such as lime, gypsum, or talc, these also must be approximately as fine as the insecticides or fungicides used, and even and thorough distribution is necessary. Professor Childs has told you of the necessity of having fine mist in liquid spray, and you all know that even with the finest mist spray the tendency is for the spray to gather in globules, and when dry, leaves the effective material in spots. The area between the spots is unprotected. With the dust properly applied the whole surface is evenly covered.

The dust is applied by means of a blower. The blowers used in large orchard work are driven by gasoline engines, and the engines you are using on the liquid-spray machines can be utilized for this purpose, thus saving a part of the cost for a blower outfit. An efficient blower can now be obtained. With it the materials are evenly fed into the air pipe, with a control on the feed so materials are not unnecessarily blown out, and providing for discharge equal to work required. This blower is mounted on any wagon or truck, and requires two men, or a man and a boy,—one to handle the team and the other to care for the discharge pipe.

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In operating, the work should be done from the windward side so the dust is carried from the operator through the orchard. The team is kept in motion and as the operator comes opposite a tree, if it be a large one, he makes a circular sweep from bottom to top and down, so as to quite completely cover the individual tree. The application should be made on both sides. This may be accomplished when winds change, or during the quiet hours of the morning. If it becomes necessary to make application during constant windy weather the team should be driven into the wind, and the operator apply to both rows, right and left, allowing dust to drift to the rear.

The question has been asked, "Can the dust be used as a dormant spray?" In answer to this I will say, we do not recomemnd the dormant spray as yet. We have successfully used the soluble sulphur as a dust application for San Jose scale for two seasons, but we are not yet able to produce this material in commercial quantity for that purpose. The dormant or delayed dormant spray with soluble sulphur or lime-sulphur as a liquid should be applied as usual. It is surprising the way the dust adheres to the foliage and fruit. You all have noticed how road dust sticks to trees along the way, even after winds and rain; then you know that there is on the young fruit a fine hairy fuzz into which the dust settles and by which it is held. Even after the fruit has become well grown and becomes apparently smooth, the evidence is the dust has uniformly produced fruit free from side worms. Even should the dust wash off a little more quickly than the liquid spray, you can repeat the dust two, three, or four times and still be ahead of your liquid spray in point of labor expense and time. This is because the dust can be applied so much more quickly. The cost of materials will at least be equal to the cost of the liquid material, but the cost of application is one-seventh to one-fifth as much as cost of liquid application, and you all know the cost of labor in these applications is the big item.

Sulphur works better if mixed with some other material. If using sulphur alone there should be mixed with it at least 10% of finely pulverized lime, gypsum, or talc. If using 10% or 15% lead no other diluent is needed. A combination which makes an all-around good application consists of 40% of tobacco dust, 50% sulphur and 10% arsenate of lead. This requires no other material as a carrier.

The dusting method has been developed at a time when most needed, as its economy will be appreciated by all commercial fruitgrowers who are only too well aware of the necessity of reducing the cost of production at every possible point. This method will also be found of great value to growers of alfalfa in control of the alfalfa weevil, and of aphis, and of grasshoppers; and to the hopgrowers in control of plant lice, and there are other possibilities for its usefulness to be yet further developed.

Ninth National Apple Show

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and perhaps have compelled overcrowding of other markets with the better varieties.

In considering the "doubtful" varieties, Mr. Sickles said the location of the orchards and the size of the fruit produced were distinct factors in determining, in each given case, whether the variety was profitable.

"Last year the growers of the Northwest shipped 1,000 or more cars of infected fruit into hundreds of markets," Mr. Sickles went on. "In some cases these shipments paid the grower a profit, if the shipment could be considered as standing by itself, but I do not need to say that the total result of this wormy campaign was a tremendous loss to the growers of the Northwest."

Washington State College won the student judging contest at the Ninth National Apple Show. The winners follow:

First, Roy Larson, Washington State College; second, L. M. Bowman, Idaho University; third, C. L. Firestone, Oregon Agricultural College.

Competition was keen, as the final scores show: Larson, 93.32 per cent; Bowman, 90.78 per cent, and Firestone, 90.25 per cent.

The contest this year was conducted along original lines. The contestants were permitted to assist the regular judges in their work for one day, studying their methods and profiting by their scoring of disputed points. The students were then delegated to judge ten entries unaided, which they had not seen the board judge. The judges then made their awards on the same ten boxes, and the students whose scores most nearly approximated the official figures were declared the winners. Mr. Tweede stated that the scores of the students on the entries were approximately the same as those made by the board.

A great feature of Apple Show week this year was a unique carnival which the business men of Spokane staged to make the time pleasant for their visitors. The apple idea was carried out sucessfully, as King Pip IX, impersonated by Frank T. McCollough, and Princess Apple Blossom, Miss Florence Russell of the Spokane Valley, ruled over the various events of the carnival.

Six of the important fruit districts of the Northwest sent to the Court of King Pip their most charming maidens to act as the princesses of Apple Land. During the week the royal party was the center of a series of brilliant ceremonies and social functions culminating in a visit from King Boreas of the St. Paul Outdoor Winter Sports Carnival, and Mr. Louis W. Hill, president of the Great Northern Railroad. Never before has the carnival spirit taken such a complete hold upon the people of Spokane and the Inland Empire. Old and young, rich and poor forgot their woes and joined in the merry making on the streets. Thousands wore special carnival costumes in the Apple Show colors—red, green and yellow.

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At the show the women's department was the largest in history. To stimulate consumption of apples, expert cooks and demonstrators showed how to concoct a thousand and one toothsome delicacies with the apple as a base. Then, too, several hundred women had their finest pies, jellies, preserves and other home-made apple by-products on exhibition during the week. One of the racks at the show which attracted much attention contained apple pies from some of America's famous hotels. The pies from the Clift and the St. Francis in San Francisco were eighteen inches in diameter.

A new feature this year that probably proved of more interest to the fruitgrower than any other one feature in the Apple Show was the operating packing house. This was a fruit-packing house actually grading and packing commercial apples that were later shipped to the East and marketed. The apples were part of the regular stock of the Spokane Fruit Growers' Company taken from Otis Orchards. In the packing house various methods prevailing in the different districts were illustrated. Part of the output was run over the old-style belt sorter, and were sized and packed by hand. The balance of the output were demonstrated in the conveyors over a Cutler sizing machine. Modern methods were demonstrated in the conveyors that lead from all machines and packing bins to the nailing press and from there to the warehouse, and many other labor-saving devices available for packing and warehouse use were shown in actual operation. The interest displayed by fruitgrowers in this feature was so great that this idea will undoubtedly have to be expanded next year to cover a much larger space.

Codling Moth Investigations

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During 1915 by far the greater percentage of worms of the first generation entered the fruit through the side rather than at the calyx end. In view of this fact it would be supposed that the calyx application would not prove of great value in controlling the moths and that the second codling moth or thirty-day spray, which is applied at the time the eggs are hatching, would be sufficient to keep the insect under control. It is shown clearly that one application, whether it be the "calyx" or the one preceding the hatching of the eggs, will not control the moths. In Experiment 1, where the calyx application only was applied, 10.8 per cent of the fruit was found to be infested by the middle of July. The application was slightly less effective than the one applied only at the time that the eggs were hatching (Exp. 4). The infestation in this experiment amounted to 9.7 per cent. In Experiment 3, where both the calyx and the "30-day" spray were employed, highly satisfactory results were obtained. In this experiment .8 per cent only of the fruit was injured by the first generation of worms.

From the results that were obtained during the past year it is safe to say that two well-timed, thorough applications will control the first generation of worms even in an orchard in which codling moth during the year previous destroyed 50 per cent of the crop.

On account of a very light crop existing in the experimental orchard, the owner felt that he could not afford to make many applications during the season. A greater portion of the orchard was sprayed as shown in Experiment 4, which permitted an infestation of 9.7 per cent over a greater portion of it. One summer application was made on August 10. It was well directed for an ordinary infestation as this was the time at which the first eggs of the second generation were beginning to hatch. The single application proved wholly inadequate and a very serious infestation occurred during late summer. This pronounced increase in the number of wormy apples is shown clearly in Experiment 3. On July 15, .8 per cent only of the fruit was found to be infested; at harvest time this had increased to 17 per cent wormy and, owing to the fact that 16 per cent possessed "stings," a total fruit loss of 33 per cent occurred.

The outcome of our experimental work during the past season makes it advisable that the station recommend two different schedules of sprays to be applied in handling the codling-moth situation during the coming season. The use of one or the other will be dependent upon the degree of infestation that occurred in the orchards during 1915. Orchardists must decide upon one or the other and follow it throughout the season or poor control will probably result.

The first two applications will be the same in both cases; that is, the calyx and "30-day" spray, for the control of the first brood of worms. Where a loss of not more than 8 per cent was experienced in 1915, one well-timed summer spray should prove very effective in controlling the second generation. This should be applied in early August. The date will be dependent upon weather conditions and the station will give out information at the time. Where the infestation during 1915 was found to be more than 8 or 10 per cent, two summer applications should be made to control the codling moth. The third spray should be made about July 20 and the fourth toward the middle or last of August.